Nurse Media Journal of Nursing
e-ISSN: 2406-8799, p-ISSN: 2087-7811
https://medianers.undip.ac.id
16(1):82–97, April 2026
https://doi.org/10.14710/nmjn.v16i1.68244

ORIGINAL RESEARCH

# Bonding from Womb: A Mixed-Method Study of Pregnant Women's Knowledge, Attitude, and Experiences on Fetal Movement

Restuning Widiasih[1], Khoirunnisa Khoirunnisa[2], Lilis Mamuroh[1], Windy Natasya AL Baihaqi[3], Tosin Popoola[4]

[1]*Department of Maternity Nursing, Faculty of Nursing, Universitas Padjadjaran, Sumedang, West Java, Indonesia*
[2]*Department of Pediatric Nursing, Faculty of Nursing, Universitas Padjadjaran, Sumedang, West Java, Indonesia*
[3]*dr. Hasan Sadikin General Hospital, Bandung, Indonesia*
[4]*School of Nursing and Midwifery, University of Newcastle, NSW, Australia*

**Article Info**

Article History:
Received: 18 November 2024
Revised: 13 January 2026
Accepted: 15 January 2026
Online: 30 April 2026

Keywords:
Fetal well-being; maternal-fetal attachment; mixed-methods research; pregnancy

Corresponding Author:
Restuning Widiasih
Department of Maternity Nursing, Faculty of Nursing, Universitas Padjadjaran, Sumedang, West Java, Indonesia
Email:
Restuning.widiasih@unpad.ac.id

**Abstract**

**Background:** Fetal movement is an important indicator of fetal life and well-being and contributes to maternal–fetal bonding. However, evidence on pregnant women's knowledge, attitudes, behaviors, self-efficacy, and experiences in self-monitoring fetal well-being remains limited.
**Purpose:** This study aimed to comprehensively examine pregnant women's knowledge, attitudes, behaviors, self-efficacy, and experiences related to fetal movement monitoring.
**Methods:** A mixed-methods study with a concurrent triangulation design was conducted. Quantitative and qualitative data were collected simultaneously through a survey of 216 respondents from two districts and interviews with 18 participants drawn from the survey pool. Comparative analysis was used to assess differences in knowledge, attitudes, behaviors, and self-efficacy between the two districts using the Mann–Whitney test for survey data, while thematic analysis was applied to the interview data.
**Results:** Overall, the majority of pregnant women demonstrated low knowledge (64.4%), negative self-monitoring behaviors (52.7%), and low self-efficacy (56.0%), while attitudes toward fetal movement self-observation were slightly more favorable (53.7%). Statistical analysis indicated significant differences in knowledge, attitudes, and behaviors related to fetal movement self-observation ($p < .05$), whereas self-efficacy was not statistically significant ($p > .05$). Thematic analysis identified four themes: (1) Bonding since in the womb; (2) Emotional responses; (3) Actions when sensing abnormalities; and (4) Culture and beliefs.
**Conclusion:** The findings suggest that mothers and fetuses form a strong emotional bond from the womb, as reflected in maternal experiences and behaviors. There is a need for nursing interventions in fetal monitoring, particularly to improve pregnant women's knowledge, attitudes, behaviors, and self-efficacy. Furthermore, this study strengthens the evidence base for maternity nursing practice, enabling nurses and midwives to design targeted educational and monitoring interventions that promote pregnant women's autonomy in observing fetal health and responding appropriately to early warning signs.

**How to cite:** Widiasih, R., Khoirunnisa, K., Mamuroh, L., AL Baihaqi, W. N., & Popoola, T. (2026). Bonding from womb: A mixed-method study of pregnant women's knowledge, attitude, and experiences on fetal movement. *Nurse Media Journal of Nursing*, *16*(1), 82–97. https://doi.org/10.14710/nmjn.v16i1.68244



## 1. Introduction

Maternal and infant mortality are two key indicators of a country's health status and the quality of its health services, including in Indonesia (Ministry of Health of the Republic of Indonesia [MoHRI], 2024a). Infant mortality is measured by the number of fetal and neonatal deaths (Lengkong et al., 2020). The World Health Organization (WHO) defines fetal death as death occurring at 28 weeks of gestation or later, before the products of conception are completely expelled from the mother, and neonatal death as death occurring within the first 7 days after birth (Gregory & Valenzuela, 2021). Globally, infant mortality remains high, with 1-9 million stillbirths and 2-4 million newborn deaths in 2020 (Boerma et al., 2023). Fetal death is common in low-

and middle-income countries, including Indonesia, with a fetal mortality rate of 16.85 per 1,000 live births. Compared with other ASEAN countries, Indonesia has the third-highest fetal mortality rate (MoHRI, 2024b), underscoring the need to accelerate efforts to reduce fetal mortality. The high fetal mortality rate should be a concern for the Indonesian government, and better efforts should be made by developing various programs to maintain the health of pregnant women and their fetuses.

The Indonesian government's health programs to improve maternal and fetal health have been comprehensive and aligned with the 2016 WHO antenatal care (ANC) model (MoHRI, 2020). This model emphasizes a shift from a purely risk-based approach to a person-centered framework that integrates evidence-based clinical interventions, timely and appropriate health information, and psychosocial and emotional support delivered by clinically competent health professionals (MoHRI, 2020). The Indonesian government adapted the model to increase the frequency of antenatal care to a minimum of 6 visits during pregnancy to detect risks of complications that may affect the mother and fetus (MoHRI, 2024b). In addition, provincial and district areas have developed innovative programs using a technological approach to accelerate reductions in the maternal mortality rate (Karlina, 2018). On the other hand, Indonesia also faces disparities in rural-urban health development, where differences between rural and urban settings are important, as they influence various aspects of health, such as health-seeking behavior and access to health facilities (Szubert et al., 2020; Wulandari et al., 2021). Moreover, there are still limited approaches that focus on empowering mothers and families' knowledge and experience in self-monitoring of fetal well-being, particularly in comparisons between rural and urban settings.

Various maternal and fetal factors have been identified as risks that increase the likelihood of fetal death, including congenital abnormalities, intranatal infections, and umbilical cord abnormalities, such as insertion, knots, and entanglement (Elsayed & Sinha, 2019). Monitoring fetal health during pregnancy, including fetal heart rate and fetal movement, can help prevent the risk factors for fetal death (Bellussi et al., 2020; Kc et al., 2016). In addition, simple yet effective fetal monitoring, such as early detection of fetal health issues, involves routinely counting fetal movements. Counting fetal movements is the only method mothers can use without needing a doctor or equipment (Mangesi et al., 2015). The characteristics of fetal movements vary with gestational age, typically felt most strongly between weeks 28 and 34. Fetal movements can occur without the mother realizing it, especially at term, when the mother recognizes about 40% of fetal movements. Fetal movements in healthy fetuses can vary between four and 100 movements per hour (Mangesi et al., 2015). Understanding the characteristics of fetal movements is essential to ensure that the fetus is healthy.

Previous studies have demonstrated that pregnant women's knowledge, attitudes, behaviors, and self-efficacy regarding fetal movement monitoring play a critical role in the timely recognition of changes in fetal health and subsequent health-seeking behavior. Adequate maternal knowledge regarding normal fetal movement patterns has been associated with increased self-efficacy in identifying abnormal changes and earlier presentation to healthcare services when concerns arise (Heazell et al., 2017). Conversely, emotional responses to fetal movement, including reassurance, joy, anxiety, and fear, are therefore closely intertwined with maternal attitudes and decision-making processes during pregnancy (McArdle et al., 2015). Evidence also suggests that women frequently rely on informal networks, such as family members, peers, and community norms, to interpret changes in fetal movement before consulting healthcare providers (Peat et al., 2012). Additionally, women with higher self-efficacy are more likely to trust their bodily changes, engage in problem-solving behaviors, and communicate concerns effectively with healthcare providers (Shorey et al., 2015).

Although existing research highlights the individual importance of knowledge, attitudes, behavior, and self-efficacy, few studies have examined these dimensions simultaneously. Previous studies have evaluated women's perspectives on cultural beliefs, previous pregnancy outcomes, and interactions with healthcare providers, underscoring the need for integrative approaches that describe both measurable outcomes and lived experiences (Dibazari & Abbasalizadeh, 2024; Hunter et al., 2019; Modde Epstein et al., 2023). Therefore, this study aimed to address these gaps by comprehensively examining pregnant women's knowledge, attitudes, behaviors, and self-efficacy, as understood through lived perspectives and experiences regarding fetal movement monitoring, using a mixed-methods approach.

## 2. Methods

### *2.1 Research design*

This study used a mixed-methods design with a concurrent triangulation approach, in which quantitative and qualitative data were collected simultaneously, analyzed separately, and then compared or integrated to strengthen the study's conclusions (Castro et al., 2010). This concurrent triangulation design approach was applied in two phases. In phase one, the study assessed pregnant women's knowledge, attitudes, behaviors, and self-efficacy regarding fetal movement counting. Phase two explored pregnant women's experiences of pregnancy and of monitoring fetal well-being, emphasizing and strengthening the meanings of knowledge, attitudes, behaviors, and self-efficacy in fetal movement monitoring. The advantage of applying mixed methods is to minimize the weaknesses associated with using only one method; using both methods is expected to provide more comprehensive results.

### *2.2 Setting and samples*

A total of 216 pregnant women were recruited through purposive sampling for the survey, with 80 from District A of Pangandaran, West Java, and 136 from District B of Garut, West Java, Indonesia. The target sample size was determined using Slovin's formula based on the number of pregnancy health service patients in the primary health centers of Districts A and B. The study involved precisely two villages from District A and five villages from District B. The study settings were chosen because both places were representative of rural (District A) and urban (District B) areas in West Java (Statistics Indonesia [BPS], 2020). The women involved in the study were selected based on the inclusion criteria as follows: (1) pregnant women in the second and third trimesters; (2) having felt fetal movement; (3) regularly checking their pregnancy in health facilities; (4) having completed a minimum of two antenatal visits at health services; and (5) residing in the study area. Participants were excluded from the study if they had pregnancy complications as documented in their ANC records and were not under the supervision of the primary health center in the study area. Interview participants were purposively selected from the survey sample based on additional criteria: (1) being recommended by their village midwife; (2) being able to independently express their opinions and experiences; and (3) providing consent to participate in the interviews after completing the survey (Creswell, 2022). A total of 18 pregnant women participated in the interviews, with recruitment continuing until data saturation was reached. Data saturation was established when no new ideas or issues emerged during the interview, as confirmed by the interviewer (Creswell, 2022).

### *2.3 Measurement and data collection*

Data were collected in two phases (Phase 1 – Survey and Phase 2 – Interviews) from July to September 2024. Prior to data collection, the principal investigator reviewed relevant literature and guidelines to adapt or develop the instruments for each phase. The survey instruments were adapted from previous theories and tools to assess knowledge, attitudes, and behaviors (Bowen, 2018; Samutri & Endriyani, 2021) and self-efficacy (Novrianto et al., 2019), with t-values > 1.96 for each item. In developing the instruments, the original English instrument by Bowen (2018) underwent back-to-back translation, whereas the instruments by Samutri and Endriyani (2021) and Novrianto et al. (2019) were already in Indonesian. The final draft of the instruments was reviewed by three experts in maternity nursing and one expert in pediatric nursing. Based on the experts' feedback, a few words in the instrument were modified to better suit the Indonesian context. For example, in questions 6, 7, and 8, the word "*Saya* [I/me/my]" was changed to "*Ibu* [Mother in reference to oneself]", while questions 10, 11, and 12 adapted certain terms to improve their cultural context, such as changing "*Pembelajaran* [learning]" to "*Edukasi kesehatan* [health education]". Another example of item adaptation involved the question "Fetal movement should be felt every day," which was translated into Indonesian as "*Apakah gerakan janin dirasakan setiap hari?*" The wording was modified to align with the appropriate Indonesian sentence structure, thereby improving clarity and comprehension for lay participants. Following minor modifications to the questionnaire, the authors conducted validity and reliability testing with 60 respondents. The respondents were selected using the same inclusion criteria as the study sample, except that they resided outside the study location and were registered at the primary health center not included in this study. For the validity test, item validity was assessed by comparing the calculated correlation coefficient ($r$) with the critical value; items were considered valid if $r$

exceeded the critical value (0.254), as demonstrated by the obtained range of 0.283–0.712. The questionnaire was considered reliable if Cronbach's alpha exceeded the threshold value of 0.6; this criterion was met, as the reliability test yielded a Cronbach's alpha of 0.815.

*2.3.1 Phase 1 – Survey*

The data collection for Phase 1 was conducted in coordination with the primary health centers responsible for pregnant women in the villages of Districts A and B. Selected participants were invited by the research team, with assistance from health cadres and village midwives, to complete the surveys at village offices or health posts. The research team coordinated with the cadres and village midwives to determine the date and location of data collection; the participants then attended the designated venue accordingly. Prior to administering the survey, the research team, consisting of three university lecturers and six nursing students, provided a detailed explanation of the study to ensure a shared understanding among participants. The survey instrument consisted of five sections: (1) demographic data; (2) knowledge; (3) attitude; (4) behavior; and (5) self-efficacy. The demographic and knowledge sections each included 8 multiple-choice items, while the attitude, behavior, and self-efficacy sections comprised 16, 8, and 10 items, respectively, using a five-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree) (Bowen, 2018; Novrianto et al., 2019; Samutri & Endriyani, 2021). Each variable was categorized into levels based on participants' scores. Knowledge was classified as high (≥76%), moderate (56-75%), and low (≤55%) (Arikunto, 2014). Attitude was categorized as favorable (≥72) and unfavorable (<72) (Wawan & Dewi, 2019), behavior as positive (≥28) and negative (<28) (Wawan & Dewi, 2019), and self-efficacy as high (≥50) and low (<50) (Wensu et al., 2021).

*2.3.2 Phase 2 - Interviews*

The exploration of women's pregnancy experiences and monitoring of fetal well-being was conducted through semi-structured interviews. The interview guide explored pregnant women's perceptions of pregnancy, fetal movement, emotional responses, and the conditions that influence them. Pilot interviews with two pregnant women were conducted to assess the questions and the accuracy of the interviewing technique. A total of 18 pregnant women from the survey pool were purposively selected based on the midwives' recommendation. The interviews were conducted in the Indonesian language for 30-60 minutes at the nearest primary health center to the participants in Districts A and B. Participants were interviewed in small groups of three to promote comfort and a sense of reassurance, as they were accompanied by familiar individuals. Five open-ended questions, developed from prior research and theories, guided the interviews: (1) What are your views and experiences regarding fetal movement assessment during pregnancy? (2) How would you describe the sensation of fetal movement? (3) How would you seek information or medical assistance if you experienced decreased fetal movement? (4) Are there differing opinions in your community regarding the frequency and pattern of normal fetal movement? and (5) What are your thoughts on counting or monitoring fetal movement in a structured manner? (Bowen, 2018; Novrianto et al., 2019; Samutri & Endriyani, 2021). All interviews were audio-recorded and conducted at health posts, based on participants' preferences and comfort.

*2.4 Data analysis*

Quantitative data were analyzed using SPSS. Univariate analysis was conducted to describe the frequency distributions of respondent characteristics and the levels of knowledge, attitude, behavior, and self-efficacy. Descriptive and inferential statistics were employed. Demographic data and general information were summarized using frequencies, percentages, means, and standard deviations. The assumption of normality was not met based on the Lilliefors test. Therefore, bivariate analysis was conducted using the Mann-Whitney U test to examine differences in knowledge, attitudes, behavior, and self-efficacy between participants from the two districts ($p < 0.05$). This non-parametric test was appropriate because the data were derived from two independent groups and measured on an ordinal scale (Polit & Beck, 2018).

Qualitative data were analyzed using Braun and Clarke's thematic analysis approach within a qualitative descriptive research framework. The analysis involved familiarizing with the data through repeated reading of transcripts (at least 3 times), generating initial codes, identifying patterns and meaningful units, and developing and refining themes (Ahmed et al., 2025). NVivo

12 was used to facilitate coding of interview transcripts, development of subcategories, and identification of themes. The findings are presented as themes supported by participants' quotations. Themes from multiple data sources were integrated to generate core themes and categories. Finally, the results of the survey and interviews are integrated and synthesized in the conclusion. Table 1 provides a detailed overview of the data analysis procedures.

**Table 1.** Concurrent triangulation of key outcomes and respective measures

| Outcomes | Phase 1 – Survey | Phase 2 – Interviews |
|---|---|---|
| Knowledge | A cross-sectional survey using multiple-choice questions was conducted to assess participants' ability to identify:<br>- Methods to identify and differentiate fetal movements<br>- Sources of information about fetal movement<br>- Methods for counting fetal movement<br>The research team compared participants' responses with a list of expected responses based on ANC program guidelines (MoHRI, 2020). Data were analyzed using the Mann-Whitney U test. | Semi-structured interviews were conducted with selected pregnant women from the survey pool, based on recommendations from village midwives. Questions focused on:<br>- Describing and articulating the sensation of fetal movement<br>- Thoughts on structured fetal movement monitoring<br>The research team recorded, transcribed, coded, and analyzed the data thematically to explore participants' knowledge of fetal movement monitoring. |
| Attitude | The cross-sectional survey included items rated using a five-point Likert scale (strongly disagree to strongly agree), covering:<br>- Importance of fetal movement as an indicator of fetal health<br>- Developmental changes in fetal movement across gestational age<br>- Role of daily monitoring and timely consultation<br>Responses were summed to generate an overall attitude score. Data were analyzed using the Mann-Whitney U test to compare two independent groups. | Semi-structured interviews were conducted with selected pregnant women, focusing on:<br>- Views and experiences related to fetal movement monitoring during pregnancy<br>The research team recorded, transcribed, coded, and thematically analyzed the data to examine participants' attitudes toward fetal movement monitoring. |
| Behavior | The cross-sectional survey included items rated on a five-point Likert scale (strongly disagree to strongly agree), covering:<br>- Self-monitoring and documentation of fetal movement<br>- Responsiveness to changes in fetal conditions and communication with healthcare providers<br>- Health-seeking behavior and autonomy in antenatal care<br>The same analytical approach used for attitudes and self-efficacy was applied. | Semi-structured interviews with selected pregnant women, focusing on:<br>- Health-seeking behavior when experiencing decreased fetal movement.<br>The research team recorded, transcribed, coded, and thematically analyzed the data to explore participants' behavior related to fetal movement monitoring. |
| Self-efficacy | The cross-sectional survey included items rated on a five-point Likert scale (strongly disagree to strongly agree), covering:<br>- Confidence in observing, managing, and responding to fetal movement concerns<br>- Problem-solving and adaptive coping skills<br>- Persistence and confidence in overcoming challenges related to fetal movement<br>The same data analytical approach used for attitude and behavior was applied. | Semi-structured interviews were conducted with selected pregnant women, focusing on:<br>- Opinions regarding the frequency and pattern of normal fetal movement<br>The research team recorded, transcribed, coded, and thematically analyzed the data to examine participants' self-efficacy regarding fetal movement monitoring. |

### *2.5 Trustworthiness/rigor*

Lincoln and Guba's criteria for trustworthiness, including credibility, dependability, confirmability, and transferability (Stahl & King, 2020) were applied to ensure rigor in the study's

qualitative component. To establish credibility, the team discussed the details of each research phase and conducted a member-checking stage. Dependability stage ensured that specialists were consulted at every stage of the study, that the results were compared with earlier studies using the same methodology, and that any discussions within the research team to finalize the themes were documented. Confirmability was achieved through reflective discussions and debriefing to critically examine potential biases and the interpretation of the data. Transferability was achieved by providing a thick description, a study protocol for the interview phase, and a table of respondents' characteristics. Reviewing the procedures and findings of external reviewers of two specialist nurses in maternity nursing helped preserve the objectivity of this study.

### *2.6 Ethical considerations*

This study obtained ethical approval from the Research Ethics Committee of Universitas Padjadjaran (No. 786/UN6.KEP/EC/2024). Ethical principles were guided by the Declaration of Helsinki (World Health Organization, 2001). The researchers ensured respect for human dignity by providing participants with clear information about the study's purpose, benefits, possible risks and inconveniences, their right to withdraw at any time, and a guarantee of anonymity and confidentiality of their personal information. Privacy and confidentiality were also maintained throughout the study. The researchers also ensured respect for justice and inclusiveness, being honest and open, and treating all respondents fairly. The research team ensured participation in the study was voluntary, with written informed consent obtained after explaining the research aim and process in detail. The participants were given time to ask any questions or clarify details after the explanation, and any misunderstandings were resolved by confirming with them. Informed consent was obtained again from each participant prior to the survey and interview.

## 3. Results

### *3.1 Characteristics of the respondents in Phase 1*

Table 2 presents the sociodemographic characteristics of the 216 respondents. In District A, most participants were within the non-risk age range for pregnancy (20–35 years), married, unemployed, and had completed senior high school. Most had their first pregnancy, with a gestational age of 14-27 weeks. A similar trend was observed among participants from District B, except that almost half had completed junior high school.

**Table 2.** Characteristics of respondents in Phase 1 (n = 216)

| Characteristics | District A | | District B | |
|---|---|---|---|---|
| | f | % | f | % |
| Age (years) | | | | |
| < 20 | 4 | 5 | 13 | 9.6 |
| 20–35 | 65 | 81.3 | 102 | 74 |
| > 35 | 11 | 13.8 | 21 | 15.4 |
| Education | | | | |
| Elementary School | 10 | 12.5 | 21 | 15.4 |
| Junior High School | 24 | 30 | 61 | 44.9 |
| Senior High School | 35 | 43.8 | 50 | 36.8 |
| University | 11 | 13.8 | 4 | 2.9 |
| Employment status | | | | |
| Worker | 13 | 16.3 | 12 | 8.8 |
| Unemployed | 67 | 83.8 | 124 | 91.2 |
| Marital Status | | | | |
| Married | 79 | 98.8 | 136 | 100 |
| Not Married | 1 | 1.3 | 0 | 0 |
| Age of Gestation | | | | |
| 14-27 weeks (Trimester II) | 41 | 51.3 | 83 | 51 |
| 28-41 weeks (Trimester III) | 39 | 48.8 | 53 | 39 |
| Parity | | | | |
| Primigravida | 46 | 57.5 | 54 | 39.7 |
| Multigravida | 34 | 42.5 | 82 | 60.3 |

*Notes*. f: Frequency; %: Percentage

### *3.2 Findings in Phase 1*

The results of this study indicated that the proportion of pregnant women with moderate-to-high knowledge was higher in District A than in District B, with the majority of respondents in District B classified as having low knowledge (79.4%). The Mann-Whitney U test showed a significant difference in knowledge of fetal movement monitoring between pregnant women in District A and District B (Asymp. Sig. [2-tailed] = 0.000, $p < 0.05$). In contrast, pregnant women in District B demonstrated more favorable attitudes and more positive behavior toward fetal movement monitoring than those in District A. These differences were statistically significant for both attitude ($p = 0.000$) and behavior ($p = 0.004$). However, there was no significant difference in self-efficacy between pregnant women in District A and District B ($p = 0.335$). The detailed results are presented in Table 3.

**Table 3.** Comparisons of knowledge, attitude, behavior, and self-efficacy on fetal movement self-observation between District A and District B (N = 216)

| Category | District A (N=80) | | District B (N=136) | | Overall (%) (N = 216) | *p*-value |
|---|---|---|---|---|---|---|
| | f | % | f | % | | |
| Knowledge | | | | | | |
| High | 18 | 22.5 | 7 | 5.1 | 11.5 | 0.000* |
| Moderate | 31 | 38.8 | 21 | 15.4 | 24.1 | |
| Low | 31 | 38.8 | 108 | 79.4 | 64.4 | |
| Attitude | | | | | | |
| Favorable | 39 | 48.8 | 77 | 56.6 | 53.7 | 0.000* |
| Unfavorable | 41 | 51.3 | 59 | 43.4 | 46.3 | |
| Behavior | | | | | | |
| Positive | 29 | 36.3 | 73 | 53.7 | 47.3 | 0.004* |
| Negative | 51 | 63.8 | 63 | 46.3 | 52.7 | |
| Self-Efficacy | | | | | | |
| High | 29 | 36.3 | 66 | 48.5 | 44 | 0.335 |
| Low | 51 | 63.7 | 70 | 51.5 | 56 | |

### *3.3 Characteristics of the respondents in Phase 2*

Phase 2 of the study consisted of semi-structured interviews with pregnant women at each health center, with participants recommended by local midwives based on the study criteria. The results of the qualitative data analysis included descriptions of participants' characteristics and identified themes, along with participants' quotations. A total of 18 pregnant women from three study areas participated in the interviews, aged 19-32 years (Table 4). Among these participants, three were primigravida, with gestational ages ranging from 16 to 39 weeks, and all had perceived fetal movement.

**Table 4.** Characteristics of participants in Phase 2

| No | Participant Code | Age | Parities | Gestation Ages |
|---|---|---|---|---|
| Participant 1 | B1 | 26 | 3 | 39 |
| Participant 2 | B2 | 24 | 2 | 16 |
| Participant 3 | B3 | 32 | 5 | 28 |
| Participant 4 | B4 | 30 | 6 | 36 |
| Participant 5 | B5 | 30 | 4 | 30 |
| Participant 6 | B6 | 27 | 3 | 28 |
| Participant 7 | B7 | 22 | 2 | 35 |
| Participant 8 | B8 | 28 | 1 | 34 |
| Participant 9 | B9 | 32 | 4 | 16 |
| Participant 10 | B10 | 22 | 2 | 20 |
| Participant 11 | B11 | 31 | 3 | 24 |
| Participant 12 | B12 | 25 | 2 | 28 |
| Participant 13 | A1 | 20 | 1 | 32 |
| Participant 14 | A2 | 19 | 1 | 20 |
| Participant 15 | A3 | 24 | 2 | 30 |
| Participant 16 | A4 | 25 | 2 | 26 |
| Participant 17 | A5 | 27 | 3 | 30 |
| Participant 18 | A6 | 26 | 2 | 24 |

*Notes*. B1-12: Women from District B (Garut); A1-6: Women from District A (Pangandaran)

*3.4 Findings in Phase 2*

Four themes emerged from the qualitative data analysis. These themes describe how mothers come to understand the meaning and characteristics of fetal movements as an initial form of communication with their babies; emotional responses that foster positive attitudes through feelings of calmness, confidence, and protection when perceiving fetal movements; and cultural experiences and beliefs that shape self-efficacy. Mothers believe that changes in fetal movements are an important sign of fetal health and a basis for action.

The behavioral aspect becomes more apparent in the actions taken upon recognizing abnormalities, showing how mothers respond, seek help, or make decisions when they detect unusual fetal movements. The results of this analysis provide further insight into pregnant women's perceptions of fetal movements, a topic that has not been extensively explored. The themes and participants' quotes are as follows.

*3.4.1 Theme 1: Bonding with the fetus from the womb*

Analysis of the interview results identified the theme of fetal bonding in pregnant women since conception. Participants shared their experiences of perceiving fetal movement, including details such as the onset of movement, which was generally felt in the fourth month, as expressed by Participants B1, B3, B7, B10, and A6; types of fetal movements, such as kicking, turning as expressed by Participants B2, B4, B6, B8, B9, and A2; the timing of fetal activity, which varied between night, daytime, and periods of rest, as well as the responses of the mother and family members to fetal movements, as expressed by Participants B4, B5, B6.

Close relationships and mutual interactions between the mother and the fetus were evident, as conveyed by the participants as follows:

> *Like this, ma'am, when we're around 4 to 5, 6, or 7 months, the movements are strong, right? The heartbeat is fast. But by 8 or 9 months, it slows a little. Usually, there's a delay, maybe only 4 or 3 movements a day. When we're about to give birth, sometimes for two or three days, there's no movement at all.* (B6)

> *It's strong, like kicking. It's like a response, like trying to talk to the dad, or the older sibling, trying to interact, saying 'baby, be healthy.* (B2)

In addition to observing the onset and activity of fetal movement, participants also paid attention to the timing of movement, as expressed by the following participant:

> *As before, it was active at night. Usually, after eating, it would be active, and every time I heard the call to prayer, it would move. So, I would regularly feel it because I ate breakfast, lunch, and dinner. Every time after eating, the baby would be active, like that, ma'am.* (B8)

When the fetus was actively moving, participants responded by interacting with the fetus and monitoring the frequency of movements to ensure that the fetus was in good condition, as stated by the following participant:

> *So, Ma'am, here's how it works. Fetal movements are monitored every hour. According to the book, from 9 PM to midnight, I count each movement. For example, if there's a kick, I'll put a coin into a glass. Then, if there's another kick 10 minutes or half an hour later, I'll put in another coin. Basically, it has to be 10 movements within 12 hours.* (B1)

Participants communicated and attempted to bond with the fetus, responded to fetal movements, counted the movements, and even involved family members when the fetus moved.

*3.4.2 Theme 2: Mother's emotional response to fetal movement*

The analysis revealed a variety of emotional responses among pregnant women when they first felt fetal movements. They felt happiness, joy, being moved, gratitude, and enthusiasm, as expressed by Participants B1, B2, B3, B4, B5, B6, B7, B8, and A3. On the other hand, some

pregnant women also felt unpleasant feelings such as anxiety, panic, worry, fear, and pain, as expressed by Participant B6, A1, A2, A3, B8, and B9. Participants stated the following:

> *The feeling? I'm happy, of course. The baby is healthy and moving perfectly, so I'm grateful. You know, when mothers are asked if they're happy, of course, they are. (B3)*

> *I've had a miscarriage before, and I've also had a baby who passed away; the baby wasn't moving, so I was scared because of the trauma from what happened before, afraid it might happen again. (B9)*

Participants experienced a range of emotional responses; however, most reported feeling happy and joyful. Some participants reported less positive emotions, which may have been influenced by previous experiences or adverse events.

*3.4.3 Theme 3: Actions taken when abnormal fetal movements are detected*

The analysis of the interview results provides information about the actions taken by mothers and their families when they notice fetal movements that deviate from the usual pattern, such as a slowdown or an absence of movement. The identified actions can be categorized into those taken by the pregnant mothers themselves (as expressed by Participants B3, A1, A2), involvement of family members or the social environment (Participants B5, B8), and, most importantly, consulting with healthcare providers, which was done by almost all participants who experienced changes in fetal movement (such as Participants A3, B2, B6, B8, B9). The actions taken by the participants are described as follows:

> *If I don't feel the movements anymore, I usually touch it, like, you know, just touch it like this to check if I can feel it. If it's strong, I'll just leave it for a while. If I'm working, maybe the baby is tired too, right? I'm always working, going here and there, so if I want to feel it, I lie down first, and then I start to feel the movements again. If I'm working or doing something, maybe the baby is tired too, so I usually rest, lie down, or move to the right or left to check if the baby is healthy. I also ask the midwife, 'How is this? My baby isn't moving*. (B5)

> *I search for information; I usually consult with the midwife. I find out by going straight to consult with the midwife. I mean, even though I can search on my phone, right? But for me, it's more accurate to go directly to the midwife.* (A3)

The participants' actions appear to follow a gradual process. They initially attempted to manage the situation independently by seeking information, then involved family, friends, and midwives. Ultimately, pregnant women sought additional examinations from healthcare providers at health centers or private clinics.

*3.4.4 Theme 4: Culture and beliefs about fetal movement*

The analysis of interview transcripts also identified a theme in which culture and beliefs influence pregnant women's interpretation of fetal movements. For example, active movements are perceived as a sign of having a boy (Participants B1, B6), while movements in the center are considered a sign of having a girl. Emotional states, such as maternal sadness, are believed to reduce fetal activity (Participants B4, B7, B9, A3), and limited maternal physical activity is also perceived to decrease fetal movement (Participants B2, B8, A6). Additionally, certain foods consumed by pregnant women are believed to affect fetal movement (Participant A5). Participants expressed as follows:

> *So, if it's around 9 in the morning after eating something sweet, I usually feel some movement. But if I'm in a car, the movements disappear, and it takes a while to feel them again. So, the movements don't feel very strong yet.* (A5)

> *Yes, I heard that if the movement is to the right (on the mom's left), it's a girl, and if it's to the left, it's a boy. Some people also say that if it's your fifth pregnancy, the baby's position tends to stay in the middle. That's what they say. (B6)*

The results of this interview identified various beliefs and cultural practices that can provide valuable information for healthcare providers to ensure that the services offered take cultural factors and beliefs into account. This understanding may help healthcare providers deliver more culturally sensitive and patient-centered care.

During the interpretation stage, data on knowledge, attitudes, behaviors, and self-efficacy regarding fetal movement among pregnant women were integrated. Quantitative and qualitative findings were compared and triangulated to assess convergence, complementarity, and divergence across data sources, thereby enhancing the validity and depth of the results by allowing numerical trends to be explained and contextualized through participants' lived experiences.

Knowledge among pregnant women was further enriched by "Theme 1: Bonding with the fetus from the womb," in which participants described how observing and perceiving fetal movements helped form a bond. "Theme 2: Mother's emotional response to fetal movement" provided additional insights into pregnant women's attitudes toward fetal movement, while "Theme 3: Actions taken when abnormal fetal movements are detected" contributed to understanding behavioral responses. Finally, "Theme 4: Culture and beliefs about fetal movement" strengthened the interpretation of self-efficacy derived from the survey data, as mothers perceive changes in fetal movement as indicators of fetal health and a basis for decision-making and action.

## 4. Discussion

This mixed-methods study provides a comprehensive overview of findings, showing that pregnant women's experiences with fetal movements encompass not only knowledge but also feelings, beliefs, and the significance they attach to these movements. The thematic analysis further clarifies how pregnant women's knowledge, attitudes, behaviors, and self-efficacy are interconnected. The results revealed interesting variations: many pregnant women demonstrated low knowledge, negative self-monitoring behaviors, and low self-efficacy, while attitudes toward fetal movement self-observation were slightly more favorable. These findings suggest that monitoring fetal movement is a highly personal experience and essential for early detection of fetal health concerns. Overall, pregnant women's knowledge, attitudes, behaviors, and self-efficacy vary and continue to require strengthening in both research locations.

The knowledge analysis indicated that most pregnant women had low levels of knowledge. These findings were reinforced by the qualitative results, which demonstrated maternal–fetal attachment, defined as the capacity to recognize fetal movement, understand its attributes, and respond to the fetus during movement. Mothers also involve siblings and family members in responding to the pregnancy. This study aligns with prior research (Berndl et al., 2013; Yani et al., 2021), which indicates that pregnant women's knowledge of fetal movement self-monitoring falls within the less-than-satisfactory category. Mothers may be able to identify and perceive these features; however, when their knowledge is limited, this may be attributed to various factors, particularly in a developing country such as Indonesia (Jabir, 2020; Tassi et al., 2021). A study by Yuan et al. (2015) demonstrated that educational attainment and access to information significantly affect the community's health knowledge in a region. Insufficient understanding of fetal movement risks may lead to the under-recognition of early signs of fetal health concerns. Indonesia, characterized by a relatively high fetal mortality rate (Statistics Indonesia [BPS], 2023), requires strengthened knowledge, improved access to information, and greater support from healthcare professionals to enhance pregnant women's understanding, as inadequate knowledge increases health risks for both the mother and the fetus.

Attitudes were observed in both districts examined, with the majority of pregnant women in District B having a favorable attitude toward self-observation of fetal movement. However, in District A, the attitude of pregnant women toward self-monitoring fetal movements was primarily classified as unfavorable. The findings pertain to interview outcomes on affective responses: mothers experienced joy upon fetal movement, while some reported discomfort. The findings from the statistical analysis are consistent with prior research, which found that pregnant women's attitudes toward self-monitoring of fetal movements were predominantly supportive

(89%), with 11% having negative perceptions of "mindfetalness", primarily citing time constraints and the perceived lack of necessity for a specific method to observe fetal movements as the most common reasons (Akselsson et al., 2017). Differences in attitudes may be shaped by mothers' individual experiences and familial support. Pregnant women with a history of complications in prior pregnancies tend to be more vigilant and attentive in monitoring fetal movements, whereas first-time mothers often have a more limited understanding and exhibit a lower degree of concern regarding the fetus's condition, including fetal movements (Suryaningsih et al., 2022). Emotional support from family and the surrounding environment has been demonstrated to significantly influence pregnant women's engagement in fetal movement monitoring (Mutawtah et al., 2023; Nafisah et al., 2025; Niu et al., 2024). In addition, healthcare professionals play a vital role in fostering positive perceptions among pregnant women and their families about fetal movement through education, counseling, and support on the significance of monitoring fetal activity (Pollock et al., 2020; Samutri & Endriyani, 2021; Weller et al., 2023). Collaboration among families, healthcare professionals, and healthcare workers, particularly nurses, is expected to improve maternal understanding of how to autonomously monitor fetal movements.

Pregnant women's experiences with fetal movement monitoring influence their behavior and self-efficacy. The findings of this study showed overall negative self-monitoring behaviors and low self-efficacy. Some pregnant women continue to engage in negative habits, whereas others engage in positive activities related to fetal movement monitoring. These behaviors are most likely influenced by a variety of contextual factors, particularly the social environment. Previous research indicates that social environment significantly influences pregnant women's health behaviors in rural areas, where social norms that do not support positive behavioral change often perpetuate harmful habits that compromise maternal and fetal health (Ma et al., 2020; Maryuni et al., 2024). These findings are consistent with theory and empirical research suggesting that social norms and environmental factors can hinder the adoption of new health habits (Ogland-hand et al., 2025).

The quantitative analysis in this study shows variations in pregnant women's behaviors when monitoring fetal movements, which are further elaborated by qualitative findings that describe the stages of maternal responses to changes in fetal movement. These stages include initially pausing to confirm the change, followed by searching for information (often via the internet), communicating concerns to family members, such as mothers or sisters, and eventually consulting healthcare providers. This gradual pattern is consistent with previous findings indicating that pregnant women obtain and process information about fetal movements from a variety of sources before deciding to seek professional help (McArdle et al., 2015; Smith et al., 2021). It is also supported by Norman and Norman (2016), who found that awareness and help-seeking behavior related to fetal movements are strongly influenced by social support and access to information. The combination of quantitative and qualitative findings confirms that, although some pregnant women demonstrate suboptimal fetal movement monitoring behavior, their decision-making processes are influenced by social norms, family support, and the role of healthcare providers. Therefore, healthcare providers should strengthen structured educational programs on fetal movement monitoring that use socially and culturally sensitive approaches, involve families as key sources of support, and guide pregnant women in evaluating health information from digital media.

A comparison of self-efficacy levels for monitoring fetal movement reveals that the majority of pregnant women in both District A and District B have low self-efficacy, with no significant difference between the two locations. The findings of the statistical analysis are consistent with those of Nafisah et al. (2025), which indicate that mothers' perceptions of inaccurate self-monitoring and inadequate antenatal health education contribute to low self-efficacy. This low level of self-efficacy can also be explained by other studies showing that individuals' personal experience, social support, and both internal and external motivation influence self-efficacy in health contexts (Niu et al., 2024). In addition, a study by He et al. (2024) showed that structured interventions, such as multidimensional exercise management, can improve self-efficacy among pregnant women with GDM by increasing their abilities and confidence in managing their health. Participants in this study, who were both primigravida and multigravida, most likely had diverse pregnancy experiences, which may have contributed to variations in self-efficacy.

The results of the qualitative analysis showed that maternal beliefs about fetal movement were influenced by cultural perceptions, such as the assumption that strong or weak movements

are related to the gender of the fetus, as well as an attitude of resignation when movements decrease, and the belief that consuming certain foods can promote fetal growth and health. These findings indicate that cultural beliefs continue to play a significant role in shaping self-efficacy. Overall, these data suggest that low self-efficacy among pregnant women is a complex issue that is influenced by individual perspectives, social support, pregnancy experiences, and demographic factors such as age and education (He et al., 2024; Nafisah et al., 2025; Niu et al., 2024). Developing nursing interventions aimed at increasing self-efficacy based on real-life experiences, evidence-based information, increased family support, and longitudinal evaluation is essential for a better understanding of the dynamics of maternal self-efficacy changes during pregnancy.

## 5. Implications and limitations

The findings of this study reveal differences in pregnant women's knowledge, attitudes, behaviors, and self-efficacy regarding fetal movement monitoring across two regions, as supported by qualitative analysis that explains their experiences and perceptions of this practice. These findings highlight the need for nurses to conduct comprehensive assessments and strengthen clinical decision-making. Specifically, nurses and midwives should incorporate routine assessments of maternal knowledge and self-efficacy regarding fetal movement monitoring into antenatal care services. Nursing care should focus on tailored health education, behavioral counseling, and empowerment interventions to boost maternal self-efficacy, enabling more effective, contextually appropriate implementation of measures to reduce fetal health risks. In addition, interventions should be culturally sensitive and take into account maternal emotional responses and beliefs, as identified in the qualitative findings.

The interpretation of these findings should be considered in light of several limitations. First, there is potential selection bias in the qualitative sample, as participants were selected by midwives, which may have favored more cooperative or communicative pregnant women. The use of group interviews may have constrained participants' willingness to disclose deeply personal experiences due to social dynamics within the group. In addition, the quantitative findings cannot be widely generalized due to the use of a non-random sampling technique. Finally, the cross-sectional design limits the ability to infer causal relationships between the examined variables and fetal movement-monitoring behavior.

## 6. Conclusion

The findings of this study show that fetal movement monitoring is a complex and personal experience, shaped by pregnant women's knowledge, attitudes, behaviors, and self-efficacy. Quantitative findings revealed higher knowledge in District A, while District B demonstrated more favorable attitudes and behaviors; however, self-efficacy remained low in both groups. Qualitative findings further explained these patterns, highlighting that emotional attachment, cultural beliefs, and social influences shape how women perceive and respond to fetal movement. Despite strong emotional bonding, limited understanding of fetal movement patterns, and reliance on informal knowledge contributed to suboptimal monitoring practices and low self-efficacy. These findings suggest that improving mothers' knowledge, attitudes, behaviors, and self-efficacy requires a consistent, context-specific, and empathetic approach. Collaboration among families and healthcare providers, particularly nurses and midwives, through prenatal education initiatives that combine evidence-based knowledge enhancement with improvements in emotional elements and mother-fetus interaction is crucial to strengthening mothers' self-monitoring abilities and laying the groundwork for the development of community-based interventions. Future studies should develop and evaluate theory-based interventions to improve maternal self-efficacy in fetal movement monitoring, and conduct longitudinal, multi-site research to examine changes in knowledge, attitudes, and behaviors across pregnancy and across diverse populations.

## Acknowledgments

The authors express sincere gratitude to the Universitas Padjadjaran Internal Grants for the generous financial support, which was vital to the successful completion of this study. The authors also thank the participants and all parties involved for their contributions to the data collection process for this project.

**Author contribution**

RW: conceptualization, data acquisition, data analysis, writing–review; KK: conceptualization, data acquisition, data analysis, writing-review; LM: conceptualization, data acquisition, data analysis, writing–review; WN: data acquisition, data analysis, writing–review; TP: data analysis, writing–review & editing. All authors have read and agreed to the published version of the manuscript.

**Conflict of interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work in this paper.

**Funding**

Universitas Padjadjaran Internal Grants

**Declaration of Use of AI in Scientific Writing**

The authors declare that no generative AI was used in the writing process or in the creation of any figures or images, except for Grammarly (which may incorporate AI) to improve the readability and language of the manuscript.

**References**

Ahmed, S. K., Mohammed, R. A., Nashwan, A. J., Ibrahim, R. H., Abdalla, A. Q., M. Ameen, B. M., & Khdhir, R. M. (2025). Using thematic analysis in qualitative research. *Journal of Medicine, Surgery, and Public Health, 6*, 100198. https://doi.org/10.1016/j.glmedi.2025.100198

Akselsson, A., Georgsson, S., Lindgren, H., Pettersson, K., & Rådestad, I. (2017). Women's attitudes, experiences, and compliance concerning the use of mindfetalness: A method for systematic observation of fetal movements in late pregnancy. *BMC Pregnancy and Childbirth, 17*, 359. https://doi.org/10.1186/s12884-017-1548-5

Arikunto, S. (2014). *Prosedur penelitian suatu pendekatan praktik* [Research procedures: A practical approach]. *Jakarta: PT Rineka Cipta*

Bellussi, F., Po', G., Livi, A., Saccone, G., De Vivo, V., Oliver, E., & Berghella, V. (2020). Fetal movement counting and perinatal mortality: A systematic review and meta-analysis. *Obstetrics & Gynecology*, *135*(2), 453–462. https://doi.org/10.1097/aog.0000000000003645

Berndl, A. M. L., O'Connell, C. M., & McLeod, N. L. (2013). Fetal movement monitoring: How are we doing as educators? *Journal of Obstetrics and Gynaecology Canada, 35*(1), 22–28. https://doi.org/10.1016/s1701-2163(15)31044-6

Boerma, T., Campbell, O. M. R., Amouzou, A., Blumenberg, C., Blencowe, H., Moran, A., Lawn, J. E., & Ikilezi, G. (2023). Maternal mortality, stillbirths, and neonatal mortality: A transition model based on analyses of 151 countries. *The Lancet Global Health, 11*(7), e1024–e1031. https://doi.org/10.1016/S2214-109X(23)00195-X

Bowen, J. H. (2018). *Pregnant women's knowledge about fetal movement counts* [Honors Undergraduate Theses, University of Central Florida]. https://stars.library.ucf.edu/honorstheses/282

Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analysis. *Journal of Mixed Methods Research, 4*(4), 342–360. https://doi.org/10.1177/1558689810382916

Creswell. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.)*. SAGE Publication.

Dibazari, Z. A.-, & Abbasalizadeh, F. (2024). Evaluation of childbirth readiness and its associated factors and consequences in pregnant women referring to health centers in Tabriz , Iran and providing strategies to promote childbirth readiness : A sequential explanatory mixed method study protocol. *BMJ Open, 14*, e087038). https://doi.org/10.1136/bmjopen-2024-087038

Elsayed, W., & Sinha, A. (2019). Umbilical cord abnormalities and pregnancy outcome. *Journal of Fetal Medicine, 06*(04), 183–189. https://doi.org/10.1007/s40556-019-00217-7

Gregory, E. C. W., & Valenzuela, C. P. (2021). User guide to the 2021 fetal death public use file. https://www.cdc.gov/nchs/data/nvsr/nvsr71/nvsr71-04.pdf

He, Y., Liu, X., & Yang, X. (2024). Effects of multidimensional exercise management on self-efficacy, blood glucose control, and delivery outcomes in pregnant women with gestational diabetes mellitus. *Frontiers in Physiology, 15,* 1407569. https://doi.org/10.3389/fphys.2024.1407569

Heazell, A. E. P., Warland, J., Stacey, T., Coomarasamy, C., Budd, J., Mitchell, E. A., & O'Brien, L. M. (2017). Stillbirth is associated with perceived alterations in fetal activity - Findings from an international case control study. *BMC Pregnancy and Childbirth, 17*(1), 369. https://doi.org/10.1186/s12884-017-1555-6

Hunter, L. J., Da Motta, G., McCourt, C., Wiseman, O., Rayment, J. L., Haora, P., Wiggins, M., & Harden, A. (2019). Better together: A qualitative exploration of women's perceptions and experiences of group antenatal care. *Women and Birth, 32*(4), 336–345. https://doi.org/10.1016/j.wombi.2018.09.001

Jabir, H. N. (2020). Faktor yang mempengaruhi perilaku ibu hamil dalam pemeriksaan kesehatan di UPT Puskesmas Lamurukung [Factors that influence pregnant mother behaviorin health examination in the Public Health Center of Lamurukung]. *Jurnal Ilmiah Kesehatan Sandi Husada, 9*(1), 548–553.

Karlina, L. (2018). Gambaran pengetahuan suami tentang suami siaga dalam masa kehamilan di Puskesmas Matakali Kecamatan Matakali Kabupaten Polewali Mandar [Overview of husbands' knowledge about being a supp.ortive husband during pregnancy at the Matakali Community Health Center]. *Bina Generasi: Jurnal Kesehatan, 8*(1), 107–117. https://doi.org/10.35907/bgjk.v8i1.56

Kc, A., Wrammert, J., Clark, R. B., Ewald, U., & Målqvist, M. Inadequate fetal heart rate monitoring and poor use of partogram associated with intrapartum stillbirth: A case-referent study in Nepal. *BMC Pregnancy Childbirth, 19*(16), 233. https://doi.org/10.1186/s12884-016-1034-5

Lengkong, G. T., Langi, F. L. F., & Posangi, J. (2020). Faktor-faktor yang berhubungan dengan kematian bayi di Indonesia [Factors associated with infant mortality in Indonesia]. *Kesmas: Jurnal Kesehatan Masyarakat Universitas Sam Ratulangi, 9*(4), 41–47. https://ejournal.unsrat.ac.id/index.php/kesmas/article/view/29482

Ma, Y., Gao, Y., Li, J., Sun, A., Wang, B., Zhang, J., Dill, S. -E., Medina, A., & Rozelle, S. (2020). Maternal health behaviors during pregnancy in rural Northwestern China. *BMC Pregnancy and Childbirth, 20*(1), 745. https://doi.org/10.1186/s12884-020-03444-3

Mangesi, L., Hofmeyr, G. J., Smith, V., & Smyth, R. M. D. (2015). Fetal movement counting for assessment of fetal wellbeing. *The Cochrane Database of Systematic Reviews, 2015*(10), CD004909. https://doi.org/10.1002/14651858.CD004909.pub3

Maryuni, M., Prasetyo, S., Martha, E., Devy, S. R., Pardosi, J. F., Anggraeni, L., & Subu, M. A. (2024). Local cultural perspectives of birth preparedness: A qualitative study in a rural subdistrict of Indonesia. *British Journal of Midwifery, 32*(8), 412–420. https://doi.org/10.12968/bjom.2024.32.8.412

McArdle, A., Flenady, V., Toohill, J., Gamble, J., & Creedy, D. (2015). How pregnant women learn about fetal movements: Sources and preferences for information. *Women and Birth: Journal of The Australian College of Midwives, 28*(1), 54–59. https://doi.org/10.1016/j.wombi.2014.10.002

Ministry of Health of the Republic of Indonesia. (2020). *Pedoman pelayanan antenatal terpadu 2020 [Integrated antenatal care guidelines 2020].* https://repository.kemkes.go.id/book/147

Ministry of Health of the Republic of Indonesia. (2024a). *Laporan akuntabilitas kinerja instansi pemerintah (LAKIP) Direktorat Gizi Kesehatan Ibu dan Anak tahun anggaran 2023* [Government agency performance accountability report of the Directorate of Maternal and Child Health Nutrition, fiscal year 2023]. Ministry of Health of the Republic of Indonesia. https://ppid.kemkes.go.id/wp-content/uploads/2025/03/Lakip-2024_compressed_compressed.pdf

Ministry of Health of the Republic of Indonesia. (2024b). *Agar ibu dan bayi selamat* [For the safety of mothers and babies]. Ministry of Health of the Republic of Indonesia.

Modde Epstein, C., Houfek, J. F., & Jones, L. P. (2023). Deep health: A qualitative, woman-centered perspective of health during pregnancy. *Midwifery, 120*, 103628. https://doi.org/10.1016/j.midw.2023.103628

Mutawtah, M. Al, Campbell, E., Kubis, H. P., & Erjavec, M. (2023). Women's experiences of social support during pregnancy: A qualitative systematic review. *BMC Pregnancy and Childbirth, 23*, 782. https://doi.org/10.1186/s12884-023-06089-0

Nafisah, N. Z., Widiasih, R., & Mamuroh, L. (2025). Overview of knowledge, attitude, and behavior of pregnant women in self-monitoring of fetal movement. *Indonesian Journal of Nursing and Health Sciences, 6*(1), 11–18. https://doi.org/10.37287/ijnhs.v6i1.5699

Niu, C., Xie, Y., Zhou, W., Ren, Y., Zheng, Y., & Li, L. (2024). Effect of social support on fetal movement self-monitoring behavior in Chinese women: A moderated mediation model of health beliefs. *Journal of Psychosomatic Obstetrics and Gynaecology, 45*(1), 2291632. https://doi.org/10.1080/0167482X.2023.2291632

Norman, I. D., & Norman, B. M. A. (2016). Juxtaposition of Hohfeldian rights, principle-based ethics, functionings, and the health-seeking behavior of Sub-Saharan Africa. *Advances in Applied Sociology, 6*, 344–362. https://doi.org/10.4236/aasoci.2016.610026

Novrianto, R., Marettih, A. K. E., & Wahyudi, H. (2019). Validitas konstruk instrumen general self-efficacy scale versi Indonesia [Construct validity of the Indonesian version of the general self-efficacy scale instrument]. *Jurnal Psikologi, 15*(1), 1–9.

Ogland-hand, C., Biroscak, B., Kim-mozeleski, J., Williams, S. M., & Hovmand, P. S. (2025). Social norms structure underlying health behaviors: Developing a feedback theory of social norm adoption for public health. *Social Sciences & Humanities Open, 12,* 102165. https://doi.org/10.1016/j.ssaho.2025.102165

Peat, A. M., Stacey, T., Cronin, R., & McCowan, L. M. E. (2012). Maternal knowledge of fetal movements in late pregnancy. *The Australian & New Zealand Journal of Obstetrics & Gynaecology, 52*(5), 445–449. https://doi.org/10.1111/j.1479-828X.2012.01462.x

Polit, D. F., & Beck, C. T. (2018*). Essentials of nursing research: Appraising evidence for nursing practice* (9th ed.). Wolters Kluwer.

Pollock, D., Ziaian, T., Pearson, E., Cooper, M., & Warland, J. (2020). Breaking through the silence in antenatal care: Fetal movement and stillbirth education. *Women and Birth: Journal of the Australian College of Midwives, 33*(1), 77–85. https://doi.org/10.1016/j.wombi.2019.02.004

Samutri, E., & Endriyani, L. (2021). Education of fetal movement counting: An effort to increase knowledge and compliance of pregnant women to do self-assessment of fetal wellbeing. *Jurnal Ners dan Kebidanan Indonesia, 9*(1), 68–75. https://doi.org/10.21927/jnki.2021.9(1).68-75

Shorey, S., Chan, S. W.-C., Chong, Y. S., & He, H.-G. (2015). Predictors of maternal parental self-efficacy among primiparas in the early postnatal period. *Western Journal of Nursing Research, 37*(12), 1604–1622. https://doi.org/10.1177/0193945914537724

Smith, V., Muldoon, K., Brady, V., & Delaney, H. (2021). Assessing fetal movements in pregnancy: A qualitative evidence synthesis of women's views, perspectives and experiences. *BMC Pregnancy and Childbirth, 21*(1), 197. https://doi.org/10.1186/s12884-021-03667-y

Stahl, N. A., & King, J. R. (2020). Expanding approaches for research: Understanding and using trustworthiness in qualitative research. *Journal of Development Education, 44*(1), 26–28.

Statistics Indonesia (BPS). (2020). *Peraturan Kepala Badan Pusat Statistik Nomor 120 Tahun 2020 tentang klasifikasi desa perkotaan dan perdesaan di Indonesia tahun 2020* [Regulation of the Head of the Central Statistics Agency Number 120 of 2020 concerning the classification of urban and rural villages in Indonesia]. Statistics Indonesia.

Statistics Indonesia (BPS). (2023). *Angka kematian bayi (AKB)/infant mortality rate (IMR) hasil long form SP2020 menurut provinsi/kabupaten/kota, 2020* [Infant mortality rate (IMR) results from the 2020 population census long form by province/regency/city]. Statistics Indonesia. https://www.bps.go.id/en/statistics-table/1/MjIyMCMx/angka-kematian-bayi-akb--infant-mortality-rate-imr--hasil-long-form-sp2020-menurut-provinsi-kabupaten-kota--2020.html

Suryaningsih, E. K., Alvianty, F. N., & Wantonoro, W. (2022). Maternal-fetal attachment and family support among pregnant women in Yogyakarta. *International Journal of Health, Science and Technology, 4*(1), 93–99. http://dx.doi.org/10.31101/ijhst.v4i1.2504

Szubert, M., Ilowiecka, M., Wilczynski, J., & Bilinski, P. (2020). Health-related behaviors of pregnant women residing in urban and rural areas in Poland. *International Journal of Environmental Research and Public Health, 17*(12), 4395. https://doi.org/10.3390/ijerph17124395

Tassi, W. D., Sinaga, M., & Riwu, R. R. (2021). Analisis faktor-faktor yang mempengaruhi perilaku ibu hamil dalam pemanfaatan pelayanan antenatal care (K4) di wilayah kerja Puskesmas Tarus [Analysis of factors affecting the behavior of pregnant women in the use of antenatal care services (K4) in the work area of the Tarus Public Health Center]. *Media Kesehatan Masyarakat, 3*(2), 175–185. https://doi.org/10.35508/mkm.v3i2.3251

Wawan, A., & Dewi, M. (2019). *Teori dan pengukuran pengetahuan, sikap dan perilaku manusia dilengkapi contoh dan kuesioner* [Theories and methods for measuring human knowledge, attitudes, and behavior, complete with examples and questionnaires]. Nuha Medika.

Weller, K., Housseine, N., Khamis, R. S., Meguid, T., Hofmeyr, G. J., Browne, J. L., & Rijken, M. J. (2023). Maternal perception of fetal movements: Views, knowledge and practices of women and health providers in a low-resource setting. *PLOS Global Public Health, 3*(3), e0000887. https://doi.org/10.1371/journal.pgph.0000887

Wensu, Z., Xidi, Z., Shaojie, L., Baohua, Z., Yunhan, Y., Huilan, X., Zhao, H., & Xiyue, X. (2021). Does the presence of anxiety and depression symptoms mediate the association between family functions and self-efficacy in pregnant women in the third trimester?: A community-based cross-sectional survey. *Frontiers Psychiatry*, *12*, 726093. https://doi.org/10.3389/fpsyt.2021.726093

World Medical Association. (2001). World Medical Association declaration of Helsinki. Ethical principles for medical research involving human subjects. *Bulletin of the World Health Organization, 79*(4), 373–374. https://iris.who.int/handle/10665/268312

Wulandari, R. D., Laksono, A. D., & Rohmah, N. (2021). Urban-rural disparities of antenatal care in South East Asia: A case study in the Philippines and Indonesia. *BMC Public Health, 21,* 1221. https://doi.org/10.1186/s12889-021-11318-2

Yani, F., Adila, D. R., & Roslita, R. (2021). Tingkat pengetahuan ibu tentang pemantauan gerakan janin pada ibu hamil dengan preeklampsia [Mothers' knowledge level about fetal movement monitoring in pregnant women with preeclampsia]. *Jurnal Cakrawala Promkes, 3*(1), 33–41. https://doi.org/10.12928/promkes.v3i1.2848

Yuan, F., Qian, D., Huang, C., Tian, M., Xiang, Y., He, Z., & Feng, Z. (2015). Analysis of awareness of health knowledge among rural residents in Western China. *BMC Public Health, 15*, 55. https://doi.org/10.1186/s12889-015-1393-2